BEARINGS FOR ROLLING MILLS

EVOLMEC

EVOLUZIONE MECCANICA

INDEX

The realization of this catalog occurred in tighter of data contained therein.
Due to the ongoing technical evolution of our products, we reserve the right to make changes, even partial.

Catalog **EVMW-01-2015**, JANUARY 2015

FOUR- ROW CYLINDRICAL ROLLERS RADIAL BEARINGS

Four-row cylindrical rollers radial bearings are used almost exclusively in the rolling stands.
They have a lower friction than the other rollers bearings and they are suitable for applications where high speeds are required.
The reduced radial encumbrance of these bearings lets the adoption of big diameter necks compared to lamination roll.
In the four-row cylindrical rollers bearings, rollers are driven on the outer ring between integrals edges or not integrals.
The inner ring is devoid of edges. The bearing can cope, within certain limits, to axial displacement of the tree compared to the lodging.
Depending on the application, bearings like this can be provided with cylindrical bore or conic. The rings, inner and outer, can be just in one piece or into several pieces.
Bearings with more than four rows cylindrical rollers and equipped cages are mostly used for big cold rolling mills for plane products, where lamination efforts are considerable and the speed very high.
Bearings with more than four rows are produced for necks of the cylinders with diameters over about 220 mm.
The outer ring is equipped with two not integral edges, while the rollers are self-guided.
The inner ring is devoid of edges, so bearings can face an axial displacement of the tree compared to the casing.

Dimensions
The encumbrance sizes of radial cylindrical rollers bearings with several rows listed in the tables comply with the norm **ISO 15-1981**.

Tolerances
Excluding specific customer requests, four row radial cylindrical rollers bearings are normally manufactured with dimensional precision class **P6** and form precision class **P5**, and those with six rows according to the normal precision. To consult the tolerances values please consult the tables from page **23** to page **27**.

Clearances
Four row cylindrical rollers radial bearings are manufactured with a radial inner clearance **C3** or **C4**, while those with six rows have variable clearances according to the use. On customer request, however, we can provide bearings with different clearances to these one. All bearings of this type, that have an helical groove in the hole of the inner ring, are manufactured with radial inner clearance **C2**. To consult radial clearance values please consult the tables on page **27**.

Misalignment
For this kind of bearings it is not expected any kind of misalignment.

TECHNICAL CHARACTERISTICS

INNER AND OUTER RINGS

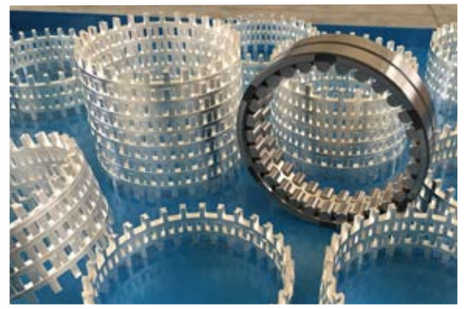
Material: Core hardened steel 100Cr6 (UNI 3097 – WNr. 1.3505) or 100CrMo7 (WNr.1.3507) according to the sizes.
On request and for special applications they can be manufactured in case-hardening steel.
Heat treatment: Annealing (annealing of workability), hardening and tempering.
These treatments will be always performed ensuring a stabilization ST0 (for use of bearings without deformations of the rings up to temperatures of 150°).
On request these treatments can be performed ensuring a final stabilization **ST1** & **ST2**.
ST1- for functioning without deformations of the rings up to 200° (**suffix ST1**)
ST2- for functioning without deformations of the rings up to 250° (**suffix ST2**).
Hardness: 58/62 HRc

To improve the working of the cage (see the following paragraph) all the outer rings produced by ***EVOLMEC*** have the **internal central flange** (see paragraph relating to available executions) **grinded**.

CAGE

Material: Brass generic ZnZCu40Pb2

Multi-row cylindrical roller bearings, that are available at the moment on the market, are provided according to the execution with two double pronged machined brass cages **guided on rolls**, pin-type cage of steel (and related drilled rollers) or with two double row window-type cages of brass.



Two double pronged machined brass cages (**Figure 1**) produced by ***EVOLMEC*** are manufactured with important changes compared to the execution available at the moment on the market.
These changes ensuring an optimal functioning of the cage that is an important and essential component for the good working of rolling bearings. A cage that is quickly manufactured with non appropriate machining can cause the early death of the rolling system and consequently of the bearing itself.
Two double pronged machined brass cages we had studied, regarding the procedure of the manufacturing, they have the following changes according to the executions currently in use:
• Production process in several stages in **order to minimize to the minimum the internal tensions of the cage.**
• Outer central flanges grinded: it ensures the **cage will be guided correctly on the inner central flange in the outer ring** (it is grinded as well). It ensures the cages to minimize to the minimum the power lost by sliding friction reducing the working temperature of bearing.

TECHNICAL CHARACTERISTICS

ROLLER LOGARITHMIC PROFILE

Material: Core-hardened steel 100Cr6 (UNI 3097)
On request they can be manufactured in case-hardening steel (drilled rollers).
Heat treatment: Annealing (annealing of workability), hardening and tempering.
Hardness: 60/64 HRc

Rollers used in these bearings will have a possible minimum outer logarithmic profile suitable to absorb a possible misalignment of housings and the neck of the cylinder where bearings will be housed and keyed. Moreover these rollers will be manufactured ensuring form tolerances of the outer profile including in a micron. It will ensure a better work charge distribution reducing the specific pressure.

SUFFIXES

A1,A2,A3,A4	changes of the inner execution
C2	radial inner clearance lower than normal
C3	radial inner clearance higher than normal
C4	radial inner clearance higher than C3
CE	inner rings and cemented outer rings
CEE	outer cemented ring
CEI	inner cemented ring
CER	inner and outer ring and cemented rollers
TB	bainitic hardening for inner rings and outer rings
TBE	bainitic gardening for router rings
TBI	bainitic gardening for inner rings
K	tapered hole, taper 1:12
K30	tapered hole, taper 1:30
P5	dimensional precision and form according class 5 ISO
P6	dimensional precision and form according class 6 ISO
2IRC	group of two double row bearings
SCA3	annular groove and three holes of lubrification on the outer ring
SCA6	annular groove and six holes of lubrification on the outer ring
SCA8	annular groove and height holes of lubrification on the outer ring
SCF	groove on the lateral faces
SCFI	groove on the lateral faces of the inner ring
SCFE	groove on the lateral faces of the outer ring
SV	groove helical of the hole
ST0	rings stabilized for uses until + 150°
ST1	rings stabilized for uses until +200°
ST2	rings stabilized for uses until + 250°

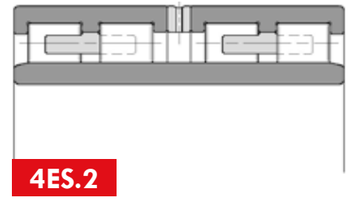
EXECUTIONS

EXECUTION 4ES.1

Two outer rings each with three integral flanges. One inner ring. Two roller guided double pronged machined brass cages. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of bearings, dimensions b and k).

EXECUTION 4ES.2

Two outer rings each with three integral flanges, and with an intermediate ring between the two outer rings. One inner ring. Two roller guided double pronged machined brass cages. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of bearings, dimensions b and k).

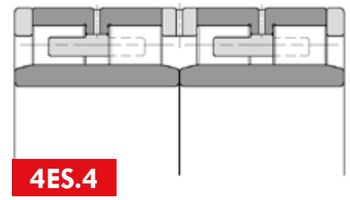


EXECUTION 4ES.3

Two outer rings each with three integral flanges. Two inner rings. Two roller guided double pronged cages of brass. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of bearings, dimensions b and k).

EXECUTION 4ES.4

Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings. Two roller guided double pronged machined brass cages. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of the bearings, dimensions b and k).

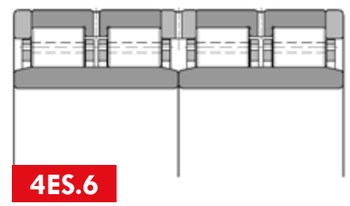


EXECUTION 4ES.5

Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings. Pierced rollers and four pin-type cages of steel or brass. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of the bearings, dimensions b and k).

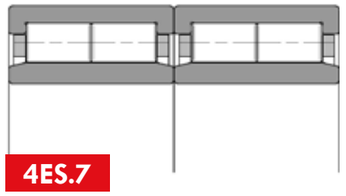
EXECUTION 4ES.6

Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings. Pierced rollers and four pin-type cages of steel or brass. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of the bearing, dimensions b and k).

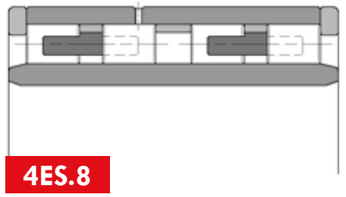


EXECUTIONS

EXECUTION 4ES.7
Two outer rings each with two integral flanges. Two inner rings. Two double row window-type machined brass cages (two rollers per cage pocket)

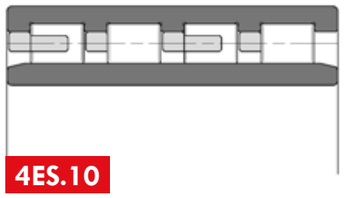


EXECUTION 4ES.8
One outer ring with three loose guide rings and two loose flange rings. One inner ring. Two double pronged machined brass cages. With or without annular groove and/or lubricating holes in the outer ring (see dimensional tables of bearings, dimensions b and k).

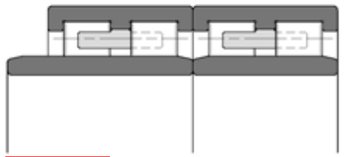


EXECUTION 4ES.9
Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings. Four pressed steel cages. With or without annular groove and/or lubricating holes in the outer rings (see dimensional tables of bearings, dimensions b and k).

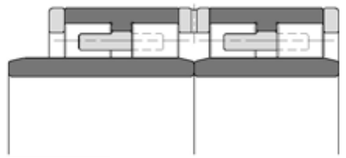
EXECUTION 4ES.10
One outer ring with five integral flanges. One inner ring. Four roller guided pronged cages of brass. With annular groove and lubricating holes in the outer ring (see dimensional tables of bearings, dimensions b and k).



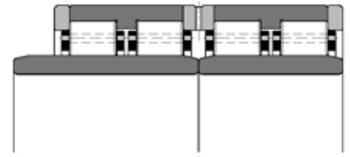
EXECUTION 4ES.11
Two outer rings each with three integral flanges. Two inner rings, one of which is extended. Two roller guided double pronged machined brass cages. With or without annular groove and/or lubrication holes in the outer rings (see dimensional tables of bearings, dimensions b and k).



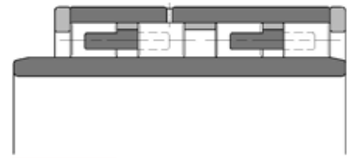
EXECUTION 4ES.12
Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings, one of which is extended. Two roller guided double pronged machined brass cages. With or without annular groove and/or lubrication holes in the outer rings (see dimensional tables of bearings, dimensions b and k).



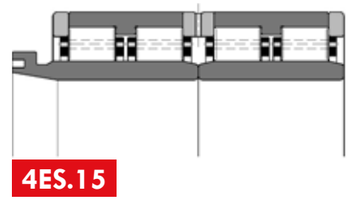
EXECUTION 4ES.13
Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings, one of which is extended. Pierced rollers and four steel pin-type cages. With or without annular groove and/or lubrication holes in the outer rings (see dimensional tables of bearings, dimensions b and k).



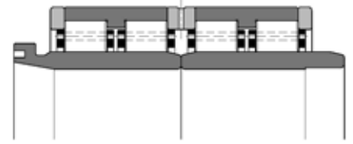
EXECUTION 4ES.14
One outer ring with three loose guide rings and two loose flange rings. One extended inner ring. Two roller guided double pronged machined brass cages. With or without annular groove and/or lubrication holes in the outer ring (see dimensional tables of bearings, dimensions b and k).



EXECUTION 4ES.15
Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two inner rings, one of which is extended and has a concentric shoulder. Pierced rollers and four steel pin-type cages. With annular groove and lubrication holes in the outer rings (see dimensional tables of bearings, dimensions b and k).

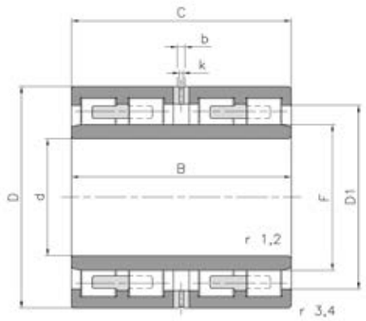


EXECUTION 4ES.16
Two outer rings each with an integral central flange and two loose flange rings; one intermediate ring. Two extended inner rings, one of which has a concentric shoulder. Pierced rollers and four steel pin-type cages. With annular groove and lubrication holes in the outer rings (see dimensional tables of bearings, dimensions b and k).

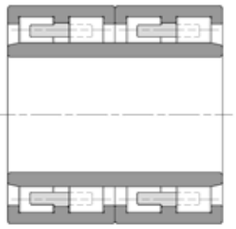


EXECUTION 4ES.17
An outer ring with five integral flanges. An inner ring. Two side-to-side massive brass cage guided on flanges in the outer ring. With or without annular groove and/or lubricating holes in the outer ring (see dimensional tables of bearings, dimensions b and k).

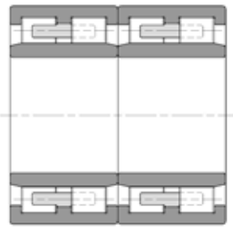
DIMENSIONAL TABLES



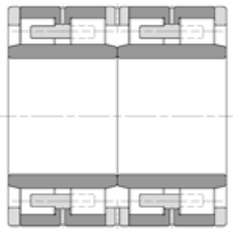
4ES.2



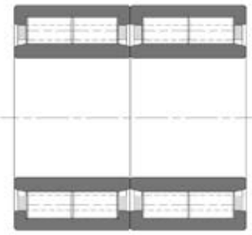
4ES.1



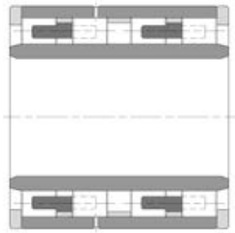
4ES.3



4ES.4



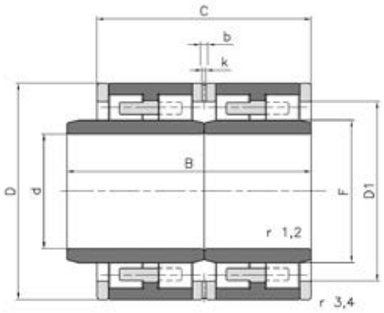
4ES.7



4ES.8

EVOLMEC												SKF				FAG			XLB			Weight
d	D	B	C	F	D_1	b	k	$r_{1,2}$	$r_{3,4}$	Load rating dyn. C KN	Load rating stat. C0 KN	CODE	Execution	CODE	Execution	Load rating dyn. C KN	Load rating stat. C0 KN	CODICE	Load rating dyn. C KN	Load rating stat. C0 KN	CODICE	Load rating dyn. C KN	Load rating stat. C0 KN	Kg
115	165	107,5	90	132,5	151	-	-	1,1	1,1	485	830	EVMW.23.11	4ES.11	BC4B 319738 A	E.11	402	765	-	-	-	-	-	-	8,5
127	174,625	150,812	150,812	139,5	159	-	-	1,1	1,5	810	1.550	EVMW.25,4.12	4ES.3	315643/VJ202	E.3	627	1.320	529469.N12BA	800	1.430	-	-	-	10,5
139,700	215	195	187	156,285	188	-	-	3	0,4	1.440	2.530	EVMW.27,9.13	4ES.14	BC4B 466971 B	E.14	1.010	2.280	-	-	-	-	-	-	25
	215	195	187	159,285	188	-	-	3	0,4	1.450	2.680	EVMW.27,9.14	4ES.14	BC4B 459696	E.14	1.210	2.550	-	-	-	-	-	-	24
145	210	155	155	166	190	-	-	1,1	1,1	935	1.790	EVMW.29.15	4ES.1/SCFE	314625	E.1/WO	792	1.560	511605	1.080	1.930	FC2942155	735	1.560	18
	225	156	156	169	197	-	-	2	2	1.130	2.010	EVMW.29.16	4ES.1/SCFE	313924 A	E.1/WO	897	1.660	512764	1.250	1.960	FC2945156	835	1.820	23
150	230	156	156	174	202	-	-	2	2	1.130	2.010	EVMW.30.17	4ES.1/SCFE	313891 A	E.1/WO	897	1.660	506962	1.140	1.860	FC3046156	825	1.810	24
160	230	130	130	180	210	-	-	1,5	1,5	915	1.600	EVMW.32.18	4ES.1/SCFE	314190	E.1/WO	781	1.340	502894B	830	1.340	FC3246130	781	1.340	17
	230	168	168	179	204	-	-	2	2	1.180	2.210	EVMW.32.19	4ES.1/SCFE	315189 A	E.1/WO	897	2.200	510150B	1.160	2.080	FC3246168	1.050	2.170	23,5
	233	180	180	178,515	206	8,9	6	2,5	1,8	1.465	2.750	EVMW.32.20	4ES.8/VSCFI	BC4B 457627 VCA	E.8/GWI	1.140	2.800	-	-	-	-	-	-	26,5
165,100	225,425	168,275	168,275	181	205	-	-	1,5	1,5	1.200	2.250	EVMW.33,02.21	4ES.3	315642/VJ202	E.3	1.010	2.240	529468.N12BA	1.100	2.000	-	-	-	20
170	230	130	130	188,5	211	-	-	2	2	860	1.650	EVMW.34.22	4ES.2	313673	E.2	671	1.400	508370	780	1.400	FC3446130	670	1.400	15
	230	160	160	185,5	212	-	3	2	2	1.150	2.270	EVMW.34.23	4ES.3	BC2B 322340/HB1VJ202	E.3	1.100	2.360	567622	1.200	2.200	-	-	-	19
	240	130	130	190	218	-	-	2	2	1.000	1.840	EVMW.34.24	4ES.1/SCFE	BC4B 635122	E.1/WO	913	1.830	510440B	1.000	1.630	FC3448130	913	1.830	19
	260	225	225	196	230	8,3	4,5	2,1	2,1	1.950	3.720	EVMW.34.25	4ES.1	313587 B	E.1	1.650	3.350	505470	1.930	3.350	FC3452225	1.650	3.310	43,5
180	260	168	168	202	233	-	-	2,1	2,1	1.400	2.600	EVMW.36.26	4ES.1/SCFE	313812	E.1/WO	1.280	2.500	507536	1.200	2.000	FC3652168	990	2.300	29,5
190	260	168	168	212	237	-	-	2	2	1.300	2.630	EVMW.38.27	4ES.1/SCFE	313651	E.1/WO	1.140	2.600	507735	1.340	2.000	FC3852168	1.140	2.600	27
	270	200	200	212	242	-	-	2,1	2,1	1.690	3.400	EVMW.38.28	4ES.1/SCFE	314199 B	E.1/WO	1.510	3.350	508657	1.660	3.000	FC3854200	1.510	3.310	37,5
	280	200	200	214	251	-	-	2,1	2,1	1.910	3.610	EVMW.38.29	4ES.1/SCFE	314049 A	E.1/WO	1.720	3.350	510199	1.830	3.150	FC3856200	1.720	3.370	41,5
200	270	170	170	222	349	-	-	2,1	2,1	1.340	2.810	EVMW.40.30	4ES.1/SCFE	314553	E.1/WO	1.170	2.700	522742B	1.290	2.600	FC4054170	1.170	2.500	28,5
	280	170	170	222	252	-	-	2,1	2,1	1.500	2.850	EVMW.40.31	4ES.1/SCFE	314385	E.1/WO	1.380	3.000	507344	1.630	3.200	FC4056170	1.380	2.870	33,5
	280	170	170	222	253	-	-	2,1	2,1	1.580	3.050	EVMW.40.32	4ES.3/SCFE	BC4B 319659	E.7/WO	1.450	3.200	-	-	-	-	-	-	35
	280	180	170	222	252	-	-	2,1	2,1	1.580	3.050	EVMW.40.33	4ES.11/SVSCF	319019	E.11/GW	1.380	3.000	-	-	-	-	-	-	35
	280	200	200	222	252	-	-	0,6	2,1	1.820	3.650	EVMW.40.34	4ES.1/SCFE	313893	E.1/WO	1.510	3.350	508726	1.630	3.200	FC4056200	1.510	3.310	39
	285	200	200	222,5	236	10	6	2,1	2	2.000	3.930	EVMW.40.35	4ES.8/SVSCFI	BC4B 457628	E.8/GWI	1.470	3.900	-	-	-	-	-	-	44
	290	192	192	226	260	-	-	2,1	2,1	1.750	3.350	EVMW.40.36	4ES.1/SCFE	313811	E.1/WO	1.540	3.200	512580B	1.800	3.150	FC4058192	1.540	3.750	42,5
	290	192	192	226	260	-	4,5	2,1	2,1	1.800	3.350	EVMW.40.37	4ES.1/SCFE	313811 A	E.1/WO	1.540	3.200	-	-	-	-	-	-	42,5
	310	230	230	229	273	-	-	2,1	2,1	2.310	4.300	EVMW.40.38	4ES.3	313639/VJ202	E.3	2.010	3.750	514958	2.700	4.250	FC4062230	2.010	3.750	63
210	290	192	192	236	264	-	-	2,1	2,1	1.690	3.600	EVMW.42.39	4ES.1/SCFE	313646	E.1/WO	1.450	3.400	507628	1.700	3.400	FC4258192	1.450	3.400	41
220	300	20	20	240	276	-	4,5	2,1	2,1	1.950	4.000	EVMW.44.40	4ES.3/SCFE	BC2B 322341/HB1VJ202	E.3/WO	1.790	3.900	567623	1.830	3.350	FCD4460200	1.790	3.900	41
	310	192	192	246	280	-	-	2,1	2,1	1.940	3.680	EVMW.44.41	4ES.1/SCFE	313839	E.1/WO	1.680	3.650	507333	1.830	3.200	FC4462192	1.680	3.650	46
	310	225	225	244	278	-	-	0,6	2,1	2.280	4.500	EVMW.44.42	4ES.1/SCFE	313894 B	E.1/WO	1.940	4.300	514461	2.200	41.500	FC4462225	1.940	4.300	54,5
	330	230	230	249	294	-	-	2,1	2,1	2.450	4.680	EVMW.44.43	4ES.3/SCFE	314889/VJ202	E.3/WO	2.050	4.000	541452	2.360	3.900	FCD4466230	2.050	4.000	68,5
230	330	206	206	260	297	-	-	2,1	2,1	2.260	4.430	EVMW.46.44	4ES.1/SCFE	313824	E.1/WO	1.870	4.000	508727B	2.160	3.900	FC4666206	1.870	4.000	58
	365	250	250	266	321	11,1	6	3	3	2.920	5.700	EVMW.46.45	4ES.4	313581 A	E.4	2.640	4.900	529113	3.150	-	FCD4673250	2.640	4.900	100

DIMENSIONAL TABLES



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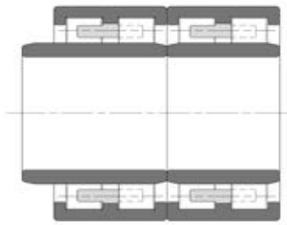

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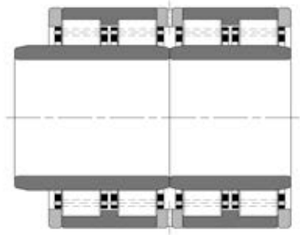

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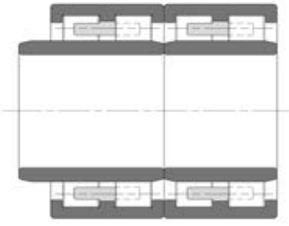


4ES.14

4ES.17

EVOLMEC												SKF				FAG			XLB			Weight
d	D	B	C	F	D_1	b	k	$r_{1,2}$	$r_{3,4}$	Load rating dyn. C KN	Load rating stat. C0 KN	CODE	Execution	CODE	Execution	Load rating dyn C KN	Load rating stat. C0 KN	CODE	Load rating dyn. C KN	Load rating stat. C0 KN	CODICE	Load rating dyn. C KN	Load rating stat. C0 KN	Kg
	330	180	180	265	299	-	-	2,1	2,1	1.950	3.830	EVMW.48.46	4ES.3/SCFE	635194	E.7/WO	1.720	3.800	504547	2.040	3.900	FC4886180	1.720	3.800	49,5
240	330	220	220	265	300	-	-	2,1	2,1	2.230	4.550	EVMW.48.47	4ES.1/SCFE	313921	E.1/WO	1.720	4.300	-	-	-	-	-	-	58
	330	240	220	270	300	-	-	2,1	2,1	2.000	4.420	EVMW.48.48	4ES.17/SCFI	BC4B 320415	E.10/WI	1.720	4.300	-	-	-	-	-	-	60
	360	290	290	270	327	8,3	4,5	8x20°	2	3.660	7.170	EVMW.48.49	4ES.4/SCFI	BC4B 322292 A/HB3	E.4/WI	3.300	6.550	514959	3.350	5.700	-	-	-	130
250	340	230	230	310	276	9	8	3	2,3x45°	2.670	5.500	EVMW.50.50	4ES.8/SVSCFI	BC4B 457629 VCA	E.8/GWI	1.870	5.000	-	-	-	-	-	-	65
	360	204	204	287	326	-	-	2,1	2,1	2.340	4.670	EVMW.52.51	4ES.3/SCFE	314997/VJ202	E.3/WO	1.980	4.400	-	-	-	FC5272204	1.980	4.400	64,5
	360	230	230	292	326	-	-	3	3	2.490	5.340	EVMW.52.52	4ES.1/SCFE	BC4B 320956	E.1/WO	1.980	4.650	533880	2.500	5.000	FC5272230	1.980	4.650	73,5
260	370	220	220	292	332	-	-	3	3	2.600	5.160	EVMW.52.53	4ES.1/SCFE	313823	E.1/WO	2.160	4.650	507336	2.200	4.050	FC5274220	2.160	4.650	77,5
	370	240	220	292	332	-	-	3	3	2.600	5.160	EVMW.52.54	4ES.11/SVSCF	BC4B 319464/HA3	E.11/GW	2.160	4.605	-	-	-	-	-	-	78,5
	400	290	290	296	352	7	5	4	4	3.950	7.650	EVMW.52.55	4ES.4/SCFI	313427 B	E.4/WI	3.520	7.100	518214	3.900	6.300	FCD5280290	3.520	7.100	135
265	370	234	234	300	336	-	-	2	2	2.600	5.560	EVMW.53.56	4ES.1/SCFE	313922	E.1/WO	2.240	5.400	517423	2.500	5.100	FC5374234	2.240	5.400	80,5
270	380	295	275	300	345	8,3	4,5	2	1	3.450	7.200	EVMW.54.57	4ES.12/SVSCFI	315605	E.12/GWI	3.080	7.200	-	-	-	-	-	-	100
	380	290	290	308,5	352	-	6	7x20°	2,1	3.400	7.700	EVMW.56.58	4ES.4/SCFI	BC4-0001	E.4/WI	2.750	6.950	-	-	-	FCD5678290	2.750	6.950	75
	390	220	220	312	352	-	-	3	3	2.600	5.250	EVMW.56.59	4ES.1/SCFE	313822	E.1/WO	2.240	5.000	507339B	2.400	4.550	FC5678220	2.240	5.000	82,5
	390	250	220	312	352	-	-	3	3	2.750	5.450	EVMW.56.60	4ES.11/SVSCF	319259	E.11/GW	2.240	5.000	-	-	-	-	-	-	84,5
280	390	275	275	308	353	11,1	6	7x20°	1,1	3.480	7.330	EVMW.56.61	4ES.4/SCFI	314719 C	E.4/WI	3.080	7.200	527104	3.600	6.800	FCD5678275	2.424	6.350	100
	400	285	285	316	360	-	-	3	3	3.700	7.700	EVMW.56.62	4ES.3/SCFE	314070/VJ202	E.3/WO	3.140	7.350	513342.N12BA	3.400	6.400	FCD5680285	3.140	7.350	120
	410	300	300	313	368	-	-	4	4	4.000	8.000	EVMW.56.63	4ES.3/SCFE	314897/VJ202	E.3/WO	3.520	7.500	510350.C4.N12BA	3.900	6.950	FCD5682300	3.520	7.450	130
	420	300	300	319	372	8,3	4,5	4	4	4.370	8.700	EVMW.56.64	4ES.4	313487	E.4	3.470	7.350	-	-	-	FCD5684300	3.470	7.350	150
290	390	190	190	316	356	-	-	2,1	2,1	2.340	4.560	EVMW.58.65	4ES.3/SCFE	635195	E.7/WO	2.050	4.550	-	-	-	FC5878190	2.050	4.550	67
	420	300	300	332	379	11,1	6	7x20°	1,5	4.180	8.800	EVMW.60.66	4ES.4/SCF	314484 D	E.4/W	3.740	8.800	524289B	4.150	8.000	FCD6084300	2.270	3.820	130
300	420	320	300	332	379	11,1	6	4	1,5	4.300	9.100	EVMW.60.67	4ES.12/SCFI	319129	E.12/WI	3.740	8.800	-	-	-	-	-	-	135
	420	330	300	332	379	11,1	6	6,4x20°	1,5	4.300	9.100	EVMW.60.68	4ES.12/SVSCFI	BC4-0003	E.12/GWI	3.740	8.800	-	-	-	-	-	-	140
320	460	240	240	364	425	-	-	3	3	3.520	6.900	EVMW.64.69	4ES.3/SCFE	BC4B 322216/VJ202	E.7/WO	2.920	7.200	804571	3.750	7.200	-	-	-	140
	480	350	350	364	426	13,9	7,5	10x20°	1,5	5.780	11.600	EVMW.64.70	4ES.4/SCFE	314274 B	E.6/WI	4.950	10.800	513654A	5.850	10.800	-	-	-	220
330	460	340	340	365	415	11,1	6	10,5x20°	1,5	4.480	10.510	EVMW.66.71	4ES.4/SCFI	313445 C	E.4/WI	4.180	10.200	543447	4.650	9.500	-	-	-	175
	480	350	350	378	431	11,1	6	8x20°	1,5	5.300	11.500	EVMW.68.72	4ES.4/SCFI	314485 A	E.4/WI	4.570	11.000	-	-	-	-	-	-	205
	480	350	350	378	431	11,1	6	8x20°	1,5	5.400	12.000	EVMW.68.72	4ES.4/SVSCFI	314485 C	E.4/GWI	4.570	11.000	527634	5.300	11.000	-	-	-	205
340	480	370	350	378	431	11,1	6	4	1,5	5.400	12.000	EVMW.68.73	4ES.12/SCFI	319040 A	E.12/WI	4.570	11.000	-	-	-	-	-	-	200
	500	370	370	385	452	-	9	13x20°	3	5.950	12.600	EVMW.68.74	4ES.4/SCFE	BC4B 322261/HB1	E.6/WI	5.230	11.800	517794	6.550	13.200	-	-	-	260
	560	380	380	396	486	-	7,5	5	4	7.560	14.000	EVMW.68.75	4ES.4/SCFE	313404 A	E.6/WI	6.820	12.900	345171	7.650	12.200	-	-	-	350
	500	380	380	389	450	-	7,5	5	5	6.000	12.600	EVMW.70.76	4ES.3	314563/VJ202	E.3	4.950	11.400	532381.N12BA	5.700	11.200	-	-	-	240
	500	410	410	388	455	16,7	9	11,5x20°	3	6.400	13.800	EVMW.70.78	4ES.4/SCFE	BC4B 322777/HB1	E.6/WI	5.830	13.700	532001	7.100	14.300	-	-	-	285
350	510	300	300	401	468	-	6	5	5	4.700	9.750	PZW.70.79	4ES.3	BC2B 319878/VJ202	E.3	4.290	9.000	-	-	-	-	-	-	220
	520	300	300	401	468	-	6	8x20°	5	5.000	9.800	PZW.70.80	4ES.1/VSCI	BC4B 326909/HA3	E.1/GWI	4.290	9.000	568450	5.100	8.800	-	-	-	220
	520	320	300	401	468	-	6	8x20,5°	5	5.160	10.160	PZW.70.81	4ES.11/VSC	BC4B 326858/HB3	E.11/GW	4.290	9.000	-	-	-	-	-	-	240

SINGLE ROW ANGULAR CONTACT BALL BEARINGS

Single row angular contact ball bearings can carry axial load in only one direction. Under the effect of a radial load, is generated in each of them, an axial force, that must be balanced: therefore are generally assembled in opposition.
In the tandem arrangement, the load lines are parallel and radial and axial loads are distributed equally between the bearings.
The load lines of "O" arranged bearings diverge towards the axis and can support axial loads in both directions, but of course with a single bearing.
With this arrangement is obtained a relatively rigid placing that is able to withstand also the overturning moments.
The load lines in the bearings arranged in an "X" converge towards the axis and, even here, you can support axial loads in both directions, but only one bearing.
With this arrangement we obtain a less rigid arrangement of the previous and less suitable to withstand the overturning loads.
Normally these bearings, have, on the same ring, a shoulder high and one low.
The lower shoulder allow to insert a large number of balls, which brings with it the advantage of a relatively high load capacity.

Dimensions
The overall dimensions of the standard bearings (identified by a standard name and not by a drawing number) are in accordance with **ISO 15-1981**.

Tolerances
The single row angular contact deep groove ball bearings of normal execution for single assembly, are built with normal tolerances. Some are also available with greater precision according to the classes **P6** and **P5**.
The values of normal, **P6** and **P5** class tolerance, are in accordance with **ISO 492-1986** and are shown in the tables from page **23** to page **27**.

Clearances
In the case of a single row angular contact deep groove ball bearings, we can talk about clearances only after assembling it in opposition with one another and the value of these clearances depends on the recording made.

Misalignment
These bearings, have a limited ability to tolerate misalignment of the inner ring from the outside world and the problems in this regard are as complex as those of single row radial bearings.
In the case of matched bearing, especially with the "O" disposition, the angular misalignment involves additional efforts between the balls and grooves and on cages and therefore a reduction in duration.
The misalignment also brings a significant reduction in silence.

TECHNICAL FEATURES

1. Outer ring
2. Inner ring
3. Cage
4. Balls

INNER AND OUTER RING

Material: Core hardened steel 100Cr6 (UNI 3097 – WNr. 1.3505) or 100CrMo7 (WNr. 1.3507) according to the dimensions.
On request they can be manufactured in case-hardening steel for specific applications.
Heat treatment: Annealing (annealing of workability), hardening & tempering
These treatments will be always performed ensuring a stabilisation ST0 (for use of bearings without dilatation of rings at temperatures 150°).
On request these treatments can be performed ensuring a final stabilisation **ST1** & **ST2**:
ST1 – for functioning without dilatation of rings until 200° (**suffix ST1**)
ST2 – for functioning without dilatation of rings until 250° (**suffix ST2**).
Hardness: 58/62 HRc

CAGE

Single row angular contact ball bearings are normally provided with one of the following types of cages, according to the range and dimensions:

machined brass cage

machined steel cage

polyamide cage

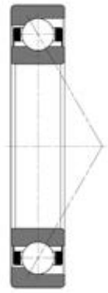
Bearings provided with polyamide 6,6 cage reinforced with glass fibres, can be used at work temperatures up to 120°.
In the applications where the temperature is constantly over 120°or under -40° C, it is necessary to use bearings with metallic cage. If there is a cooling system that uses constantly ammonia we recommend bearings with steel massive cage.

BALLS

Material: Core-hardened steel 100Cr6 (UNI 3097)
Heat treatment: Annealing (annealing of workability), hardening & tempering
Hardness: 60/64 HRc

EXECUTIONS AND ARRANGEMENTS

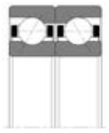
Execution with an high abutment and a low one for the outer ring and with two high abutments for the inner ring .



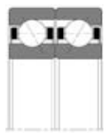
TYPE OF THE DISPOSITION

Single row angular contact ball bearings produced by ***EVOLMEC*** can be combined in several positions, that they change according to the degree of stiffness and requirements for the charge set up by the application. Possible arrangements are illustrated in the following figures, where it is also specified suffixes that are used in denominations of groups of bearings side by side.

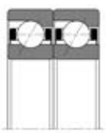
"O" disposition of bearings (back to back)
In the "O" dispositions load lines diverge towards bearing axis.
Axial loads are allowed in both directions, but only on one bearing or group of bearings in each directions.
"O" assembled bearings ensure a quite stiff disposition that can support also tilting moments.



"O" disposition.
Suff: **DB (DD)**

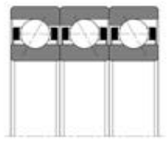


"X" disposition.
Suff: **DF (FF)**

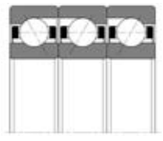


Tandem disposition.
Suff: **DT (T)**

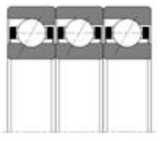
"X" disposition of bearings (face to face)
In the "X"(face to face) dispositions the load lines converge towards the bearing axis.
The axial loads are allowed in both directions, but only on one bearing or one group of



"O" disposition.
Suff: **TBT (TD)**

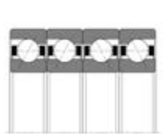


"X" disposition.
Suff: TFT **(TF)**

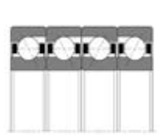


Tandem disposition.
Suff: **TT (3T)**

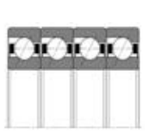
Tandem disposition of bearings
The load axial capacity of a bearings disposition can be increased integrating bearings in tandem disposition.
In the tandem dispositions bearings the load lines are parallels, so the radial and axial loads are equally deployed among the bearings of the group.
These groups of bearings can support axial loads that act in only one direction.
If the axial loads act in an opposite direction, or with combined loads, further bearings could be integrated, combined with a tandem disposition.



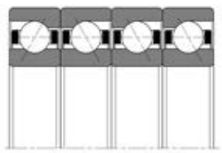
"O" disposition.
Suff: **QBC (TDT)**



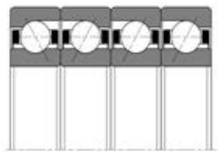
"X" disposition.
Suff: **TFT (TF)**



Tandem disposition.
Suff: **TT (3T)**



"O" disposition.
Suff: **QBT (3TD)**

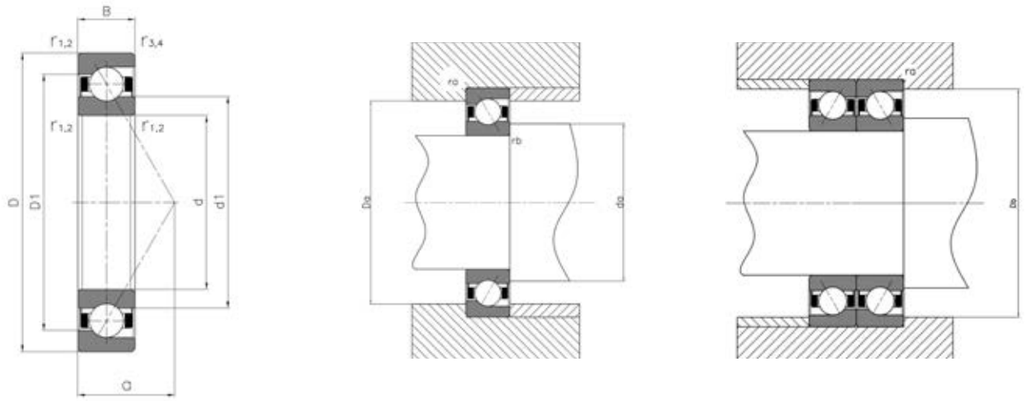


"X" disposition".
Suff: **QFT (3FT)**

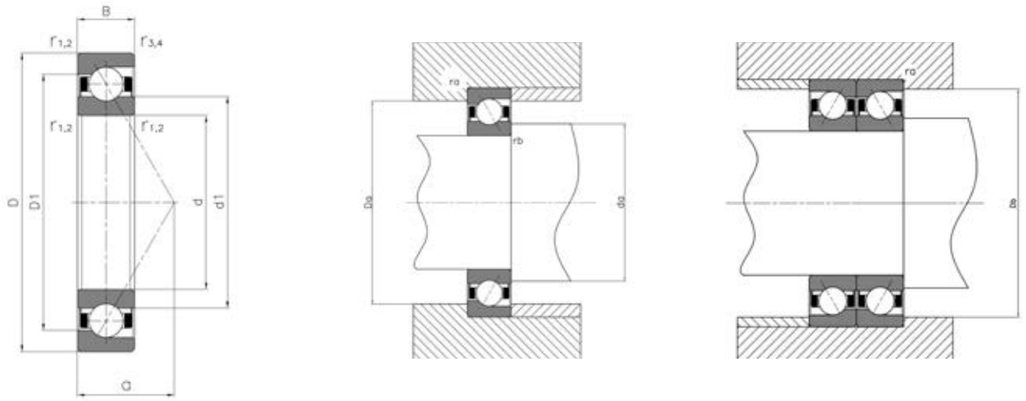
SUFFIXES

A	contact angle of 30°
AC	contact angle of 25°
B	contact angle of 40
CA	bearing for universal assembling with disposition "O" or "X" the inner axial clearance is lower than normal CB
CB	bearing for universal assembling with disposition "O" or "X" the inner axial clearance is that nominal
CC	bearing for universal assembling with disposition "O" or "X" the inner axial clearance is higher than normal CB
DB	two side by side bearings "O"
DBA	two side by side bearings "O" with a light preload
DBB	two side by side bearings "O" with a medium preload
DF	two side by side bearings "X"
DFA	two side by side bearings "X" with a light preload
DT	two side by side tandem bearings
E	inner geometry optimized
F	massive steel cage
G	bearing for universal assembling with disposition "O" or "X" there is an axial clearance
GA	bearing for universal assembling with disposition "O" or "X" there is a light preload
GB	bearing for universal assembling with disposition "O" or "X" there is a medium preload
GC	bearing for universal assembling with disposition "O" or "X" there is an high preload
M	massive brass cage centered on the balls
MB	massive brass cage centered on the inner ring
P	polyamide cage pressed 6,6 reinforced with glass fibers
ST0	rings stabilized for uses until +150°C
ST1	rings stabilized for used until +200°C
ST2	rings stabilized for uses until + 250°C

DIMENSIONAL TABLES



EVOLMEC																SKF	Weight
d	D	B	d1 ≈	D1 ≈	r1,2 min	r3,4 min	a	Adjacent dimensions da min	Da max	Db max	ra max	rb max	Load rating dyn. C KN	stat. C0 KN	CODE	CODE	Kg
100	140	20	112	128	1,1	0,6	26	107	133	135	1	0,6	60,5	65,5	EVCO 0100	71920 CD/P4A	0,80
	140	20	122	128	1,1	0,6	38	107	133	135	1	0,6	57,2	63	EVCO 0101	71920 ACD/P4A	0,80
	150	24	116	134	1,5	0,6	29	109	141	145	1,5	0,6	83,2	85	EVCO 0102	7020 CD/P4A	1,25
	150	24	116	134	1,5	0,6	41	109	141	145	1,5	0,6	79,3	80	EVCO 0103	7020 ACD/P4A	1,25
	180	34	124	155	2,1	1	36	112	168	173	2	1	156	137	EVCO 0104	7220 CD/P4A	3,25
	180	34	124	155	2,1	1	50	112	168	173	2	1	148	129	EVCO 0105	7220 ACD/P4A	3,25
105	145	20	117	133	1,1	0,6	37	112	138	140	1	0,6	61,8	69,5	EVCO 0106	71921 CD/P4A	0,82
	145	20	117	133	1,1	0,6	39	112	138	140	1	0,6	57,2	65,5	EVCO 0107	71921 ACD/P4A	0,82
	160	26	122	143	2	1	31	115	150	154	2	1	95,6	96,5	EVCO 0108	7021 CD/P4A	1,60
	160	26	122	143	2	1	44	115	150	154	2	1	90,4	93	EVCO 0109	7021 ACD/P4A	1,60
	190	36	131	164	2,1	1,1	38	117	178	183	2	1	172	153	EVCO 0110	7221 CD/P4A	3,85
	190	36	131	164	2,1	1,1	53	117	178	183	2	1	163	146	EVCO 0111	7221 CD/P4A	3,85
110	150	20	122	138	1,1	0,6	27	117	143	145	1	0,6	62,4	72	EVCO 0112	71922 CD/P4A	0,86
	150	20	122	138	1,1	0,6	40	117	143	145	1	0,6	58,5	68	EVCO 0113	71922 ACD/P4A	0,86
	170	28	129	151	2	1	33	120	160	164	2	1	111	108	EVCO 0114	7022 CD/P4A	1,95
	170	28	129	151	2	1	47	120	160	164	2	1	104	104	EVCO 0115	7022 ACD/P4A	1,95
	200	38	138	172	2,1	1,1	40	122	188	193	2	1	178	166	EVCO 0116	7222 CD/P4A	4,55
	200	38	138	172	2,1	1,1	55	122	188	193	2	1	168	160	EVCO 0117	7222 ACD/P4A	4,55
120	165	22	133	152	1,1	0,6	30	127	158	160	1	0,6	78	91	EVCO 0118	71924 CD/P4A	1,15
	165	22	133	152	1,1	0,6	44	127	158	160	1	0,6	72,8	86,5	EVCO 0119	71924 CD/P4A	1,15
	180	28	139	161	2	1	34	130	170	174	2	1	114	122	EVCO 0120	7024 CD/P4A	2,10
	180	28	139	161	2	1	49	130	170	174	2	1	111	116	EVCO 0121	7024 ACD/P4A	2,10
	215	40	150	187	2,1	1,1	43	132	203	208	2	1	199	193	EVCO 0122	7224 CD/P4A	5,40
	215	40	150	187	2,1	1,1	60	132	203	208	2	1	190	183	EVCO 0123	7224 ACD/P4A	5,40
	215	40	157	180	2,1	1,1	90	132	203	208	2	1	165	163	EVCO 0124	7224 BCBM/P5	6,10
	215	40	157	180	2,1	1,1	90	132	203	208	2	1	165	163	EVCO 0125	7224 BGAM/P5	6,10
130	180	24	145	165	1,5	0,6	33	139	171	175	1,5	0,6	92,3	108	EVCO 0126	71926 CD/P4A	1,55
	180	24	145	165	1,5	0,6	48	139	171	175	1,5	0,6	87,1	102	EVCO 0127	71926 ACD/P4A	1,55
	200	33	152	178	2	1	39	140	190	194	2	1	148	156	EVCO 0128	7026 CD/P4A	3,20
	200	33	152	178	2	1	55	140	190	194	2	1	140	150	EVCO 0129	7026 ACD/P4A	3,20
	230	40	162	200	3	1,1	44	144	216	223	2,5	1	216	224	EVCO 0130	7226 CD/P4A	6,30
	230	40	162	200	3	1,1	62	144	216	223	2,5	1	203	212	EVCO 0131	7226 ACD/P4A	6,30
	230	40	169	193	3	1,1	96	144	216	223	2,5	1	186	193	EVCO 0132	7226 BM/P5	6,95
140	190	24	155	175	1,5	0,6	34	149	181	185	1,5	0,6	95,6	116	EVCO 0133	71928 CD/P4A	1,65
	190	24	155	175	1,5	0,6	51	149	181	185	1,5	0,6	90,4	110	EVCO 0134	71928 ACD/P4A	1,65
	210	33	162	188	2	1	40	150	200	204	2	1	153	166	EVCO 0135	7028 CD/P4A	3,40
	210	33	162	188	2	1	58	150	200	204	2	1	146	156	EVCO 0136	7028 ACD/P4A	3,40
	250	42	169	208	3	1,1	103	154	236	243	2,5	1	182	196	EVCO 0137	7228 BM/P5	8,85
150	210	28	168	192	2	1	38	160	200	204	2	1	125	146	EVCO 0138	71930 CD/P4A	2,55
	210	28	168	192	2	1	56	160	200	204	2	1	119	140	EVCO 0139	71930 ACD/P4A	2,55
	225	35	174	201	2,1	1	43	162	213	219	2	1	172	190	EVCO 0140	7030 CD/P4A	4,15
	225	35	174	201	2,1	1	62	162	213	219	2	1	163	180	EVCO 0141	7030 ACD/P4A	4,15



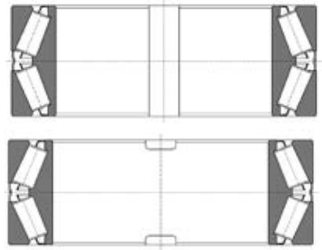
EVOLMEC																SKF	Weight
d	D	B	d1 ≈	D1 ≈	r1,2 min	r3,4 min	a	Adjacent dimensions da min	Da max	Db max	ra max	rb max	Load rating dyn. C KN	stat. C0 KN	CODE	CODE	Kg
160	220	28	178	202	2	1	40	170	210	214	2	1	130	160	EVCO 0142	71932 CD/P4A	2,70
	220	28	178	202	2	1	58	170	210	214	2	1	124	153	EVCO 0143	71932 ACD/P4A	2,70
	240	38	185	215	2,1	1	46	172	228	234	2	1	195	216	EVCO 0144	7032 CD/P4A	5,10
	240	38	185	215	2,1	1	66	172	228	234	2	1	182	204	EVCO 0145	7032 ACD/P4A	5,10
170	230	28	188	212	2	1	41	180	220	224	2	1	133	166	EVCO 0146	71934 CD/P4A	2,85
	230	28	188	212	2	1	61	180	220	224	2	1	124	160	EVCO 0147	71934 ACD/P4A	2,85
	260	42	199	231	2,1	1,1	50	182	248	253	2	1	212	245	EVCO 0148	7034 CD/P4A	6,85
	260	42	199	231	2,1	1,1	71	182	248	253	2	1	199	232	EVCO 0149	7034 ACD/P4A	6,85
180	250	33	201	229	2	1	54	190	240	244	2	1	168	212	EVCO 0150	71936 CD/P4A	4,20
	250	33	201	229	2	1	67	190	240	244	2	1	159	200	EVCO 0151	71936 ACD/P4A	4,20
	280	46	212	248	2,1	1,1	54	192	268	273	2	1	242	290	EVCO 0152	7036 CD/P4A	8,90
	280	46	212	248	2,1	1,1	77	192	268	273	2	1	229	275	EVCO 0153	7036 ACD/P4A	8,90
190	260	33	211	239	2	1	47	200	250	254	2	1	172	220	EVCO 0154	71938 CD/P4A	4,35
	260	33	211	239	2	1	69	200	250	254	2	1	163	208	EVCO 0155	71938 ACD/P4A	4,35
	290	46	222	258	2,1	1,1	55	202	278	283	2	1	247	300	EVCO 0156	7038 CD/P4A	9,35
	290	46	222	258	2,1	1,1	79	202	278	283	2	1	234	290	EVCO 0157	7038 ACD/P4A	9,35
200	280	38	224	256	2,1	1	51	212	268	274	2	1	208	265	EVCO 0158	71940 CD/P4A	6,10
	280	38	224	256	2,1	1	75	212	268	274	2	1	199	250	EVCO 0159	71940 ACD/P4A	6,10
	310	51	234	276	2,1	1,1	60	212	298	303	2	1	296	390	EVCO 0160	7040 CD/P4A	12,00
	310	51	234	276	2,1	1,1	85	212	298	303	2	1	281	365	EVCO 0161	7040 ACD/P4A	12,00
220	300	38	244	276	2,1	1	54	232	288	294	2	1	221	300	EVCO 0162	71944 CD/P4A	6,60
	300	38	244	276	2,1	1	80	232	288	294	2	1	208	285	EVCO 0163	71944 ACD/P4A	6,60
	340	56	258	302	3	1,1	66	234	326	333	2,5	1	338	455	EVCO 0164	7044 CD/P4A	16,00
	340	56	258	302	3	1,1	94	234	326	333	2,5	1	319	440	EVCO 0165	7044 ACD/P4A	16,00
240	320	38	267	295	2,1	1,1	84	252	308	313	2	1	212	300	EVCO 0166	71948 ACD	8,50
	360	56	278	322	3	1,1	68	254	346	353	2,5	1	345	490	EVCO 0167	7048 CD/P4A	17,00
	360	56	278	322	3	1,1	98	254	346	353	2,5	1	325	465	EVCO 0168	7048 ACD/P4A	17,00
280	380	46	313	349	2,1	1,1	119	292	368	373	2	1	255	380	EVCO 0169	71965 ACD/P5	15,00
	420	65	335	367	4	1,5	74	298	402	411	3	1,5	390	610	EVCO 0170	7056 CGAM/P5	30,00
	420	65	335	367	4	1,5	134	298	402	411	3	1,5	351	550	EVCO 0171	7056 AM/P5	30,00
300	460	74	363	400	4	1,5	147	318	442	451	3	1,5	423	695	EVCO 0172	7060 AM/P5	42,50
360	540	82	431	474	5	2	171	382	518	530	4	2	520	950	EVCO 0173	7072 AM/P5	62,50
380	480	46	413	448	2,1	1,1	123	392	468	473	2	1	291	500	EVCO 0174	71876 ACGAMB/P5	18,00
	520	65	427	475	4	1,5	137	398	502	511	3	1,5	410	735	EVCO 0175	71976 ACGAMB/P5	41,50
	560	82	451	495	5	2	177	402	538	550	4	2	507	950	EVCO 0176	7076 AMB/P5	65,50
460	580	56	498	540	3	3	178	474	566	566	2,5	2,5	371	765	EVCO 0177	71892 AMB/P5	34,50
	680	100	547	599	6	3	215	488	652	666	5	2,5	689	1.460	EVCO 0178	7092 AM/P5	120,00
530	650	56	570	612	3	1,1	198	544	636	643	2,5	1	390	900	EVCO 0179	718/530 AMB/P4	39,50
670	820	69	720	772	4	1,5	250	688	802	811	3	1,5	527	1.250	EVCO 0180	718/670 AMB/P5	80,00
710	870	74	763	818	4	1,5	221	728	852	861	3	1,5	605	1.630	EVCO 0181	718/710 ACMB/P5	93,50

DOUBLE DIRECTION TAPERED ROLLED THRUST BEARINGS

Double direction tapered roller thrust bearings allow the realization of compact axial systems, they can support very high axial loads, they are insensitive to impacts and they are very stiff.
Being decomposable, types with cage can be installed assembling separately and easily two thrust rings and the cage rollers set.
This kind of bearings are mainly used in steel mills, in combination with multi-row radial rollers cylindrical types.
Since double-effect tapered rollers axial bearings are normally assembled with free coupling both on the neck of the cylinder and on the housing of the crankset, to prevent the rotation on the housing, the shaft washer is provided with one or two stopping carvings, where a key is inserted, or by similar means.
Two types of executions exist :

EXECUTION ESB.1

This execution, with plain central shaft washer, is the most common because it tolerates a light eccentricity of the shaft, according to the hole of the housing, to the order of the inner radial clearance of the radial bearing that combines them. Between shaft washers for housing there is a distance ring, in a manner proportionated that it is possible to tighten fully the screws.



EXECUTIONS ESB.2 / ESB.3

These executions have tapered raceways on the shaft washers. Thanks to this they have a higher load capacity according to that with the plain central shaft washer and somehow they also can radially constrain the shaft.

EXECUTION 2: A STOPPING CARVING
EXECUTION 3: TWO STOPPING CARVINGS

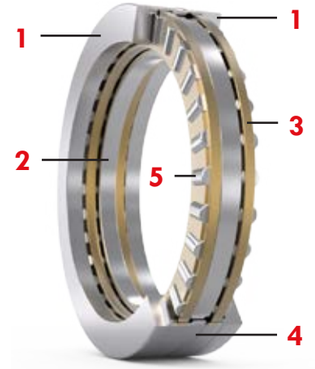
Dimensions
Dimensions of tapered rollers axial bearings have not been unified

Tolerances
Except for some exceptions, tolerances of the hole and the inner diameter of the double-effect tapered rollers axial bearings are those normal according to **ISO 199-1979**. Tolerances on the height and on the rotation precision differ from normal values. On request an indication on values relating to a specific bearing is given.

Misalignment
The tapered rollers axial bearings with plain shaft washers do not allowed any misalignment of the shaft according to the housing, nor any mistake of squaring of supporting surfaces .

TECHNICAL FEATURES

1. Shaft washer for housing
2. Shaft washer
3. Cage
4. Spacer ring
5. Tapered roller



INNER & OUTER SHAFT WASHER

Material: **Core hardened steel 100 Cr6 (UNI 3097 – WNr. 1.3505) or 100 CrMo7 (WNr. 1.3507)** according to dimensions.
On request they can be manufactured in case-hardening steel for specific applications.
Heat treatment: **Annealing (annealing of workability), hardening & tempering**
These treatments will always be performed ensuring a stabilization **ST0** (for use of bearings without dilatation of ring until temperatures of 150° C)
On request these treatments can be performed ensuring a final stabilization **S1** & **S2**:
ST1 – For operation without dilatation of rings until 200°C (**suffix ST1**)
ST2 – For operation without dilatation of rings until 250°C (**suffix ST2**)
Hardness: **59/62 HRc**

CAGE

Double direction tapered roller thrust bearings not with full complements of rollers have a massive brass cage or in pivots steel type.

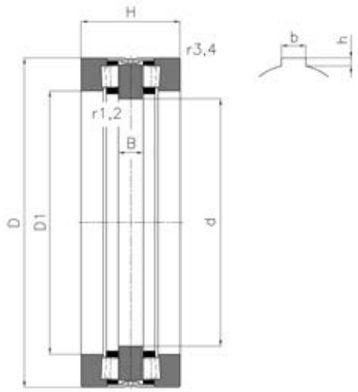
TAPERED ROLLERS

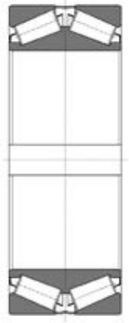
Tapered rollers axial bearings have a “logarithmic” profile between slopes and rollers, to ensure an optimal distribution of loads within them and increase the duration.

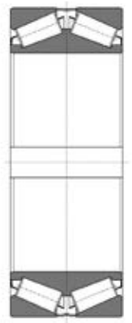
Material: **Core hardening steel 100 Cr6 (UNI 3097)**
Heat treatment: **Annealing (annealing of workability), hardening & tempering**
Hardness: **60/64 HRc**

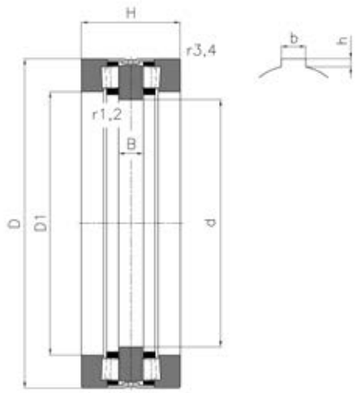
On request they can be manufactured in case-hardening steel (drilled rollers) for specific applications.

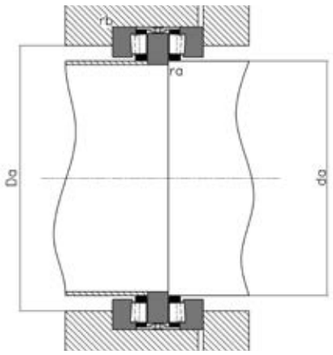
DIMENSIONAL TABLES











EVOLMEC													EVOLMEC-SKF			SKF		FAG			Weight
d	D	H	D_1	B	b	h	$r_{1,2}$ min	$r_{3,4}$ min	Adjacent dimensions d_a	D_a max	r_a max	r_b max	CODE	Execution	Load rating dyn. C	stat. C0	CODE	Execution	CODE	Load rating dyn. C	stat. C0	
															KN	KN				KN	KN	Kg
170	240	84	184	20	-	-	0,6	2	182	190	0,6	2	**EVRC 0100**	**ESB.1**	330	1.290	**350980 C**	**BFD.1**	**528974**	380	1.430	12,5
180	280	90	196	20	-	-	1	2	192	205	1	2	**EVRC 0101**	**ESB.1**	561	2.400	**353162**	**BFD.1**	**528294**	720	3.250	22
220	300	96	236	22	-	-	0,6	2	231	245	0,6	2	**EVRC 0102**	**ESB.1**	440	1.660	**351019 C**	**BFD.1**	**528876**	570	2.240	20
240	320	96	256	22	-	-	0,6	2	251	265	0,6	2	**EVRC 0103**	**ESB.1**	418	1.900	**351182 C**	**BFD.1**	**529086**	610	2.600	21,5
250	380	100	275	22	30	6,7	0,6	2	267	285	0,6	2	**EVRC 0104**	**ESB.1**	897	4.550	**353005**	**BFD.1**	**522010**	980	5.200	43,5
260	360	92	285	20	-	-	1	2	276	290	1	2	**EVRC 0105**	**ESB.1**	605	2.600	**350981 C**	**BFD.1**	**509352**	680	3.100	28
270	450	180	310	45	40	10	2	5	300	325	2	4	**EVRC 0106**	**ESB.1**	1.650	6.000	**351164 C**	**BFD.1**	**527907**	2.000	8.500	120
305,07	530	200	410	200	36,1	30	6,4	6,4	363	410	6	6	**EVRC 0107**	**ESB.2**	2.380	10.600	**BFDB 353194/HB3**	**BFD.2**	**-**	-	-	185
320	440	108	355	26	-	-	1,1	3	348	360	1	2,5	**EVRC 0108**	**ESB.1**	990	4.650	**353102 C**	**BFD.1**	**528562**	980	4.900	48,5
	470	130	350	30	-	-	1,1	3	340	360	1	2,5	**EVRC 0109**	**ESB.1**	1.300	5.700	**350982 C**	**BFD.1**	**509654**	1.340	6.550	80
350	490	130	390	30	-	-	1,1	3	380	400	1	2,5	**EVRC 0110**	**ESB.1**	1.170	5.100	**351100 C**	**BFD.1**	**530739**	1.320	6.700	73,5
	540	135	400	30	-	-	1,1	4	384	405	1	3	**EVRC 0511**	**ESB.1**	1.720	9.150	**353006**	**BFD.1**	**522008**	1.800	10.400	115
380	560	130	430	32	45	10	1,5	3	416	435	1,5	2,5	**EVRC 0112**	**ESB.1**	1.790	10.000	**351175 C**	**BFD.1**	**513125**	1.800	10.800	110
	650	215	450	65	55	10	2	4	446	470	2	3	**EVRC 0113**	**ESB.1**	3.360	16.600	**BFDB 353204**	**BFD.1**	**545936**	3.750	19.300	275
400	650	200	527	200	50,8	19	4	4	480	527	4	4	**EVRC 0114**	**ESB.2**	2.700	13.700	**353106**	**BFD.2**	**-**	-	-	235
	650	200	527	200	50,8	19	4	4	480	527	4	4	**EVRC 0115**	**ESB.2**	2.700	13.700	**353106 C**	**BFD.2**	**-**	-	-	235
	650	200	527	200	50,8	19	4	4	480	527	4	4	**EVRC 0116**	**ESB.3**	2.700	13.700	**353106 D**	**BFD.3**	**-**	-	-	230
420	620	170	465	35	56	10	1,5	3	455	485	1,5	3	**EVRC 0117**	**ESB.1**	2.420	12.200	**351121 C**	**BFD.1**	**509392**	2.280	12.000	185
	620	185	465	50	-	-	1,5	3	455	485	1,5	3	**EVRC 0118**	**ESB.1**	2.420	12.200	**BFDB 353200/HA3**	**BFD.1**	**545991**	2.280	12.000	200
440	645	167	490	50	45	11	3	4	480	510	2,5	3	**EVRC 0119**	**ESB.1**	1.980	10.800	**353152**	**BFD.1**	**534038**	2.240	12.700	190
450	645	155	490	38	45	11	4	4	480	510	3	3	**EVRC 0120**	**ESB.1**	1.980	10.800	**350916 D**	**BFD.1**	**513401**	2.240	12.700	170
470	720	200	535	50	55	11	2	4	515	550	2	3	**EVRC 0121**	**ESB.1**	3.410	17.600	**353151**	**BFD.1**	**509391**	3.400	19.300	285
	720	200	535	40	55	10	2	4	515	550	2	3	**EVRC 0122**	**ESB.1**	3.410	17.600	**351301 B**	**BFD.1**	**-**	-	-	285
	720	210	535	60	-	-	2	4	515	550	2	3	**EVRC 0123**	**ESB.1**	3.410	17.600	**BFDB 353238/HA3**	**BFD.1**	**549701**	3.400	19.300	305
530	710	218	575	57	45	10	2	3	560	590	2	2,5	**EVRC 0124**	**ESB.1**	2.200	11.000	**351475 C**	**BFD.1**	**511746**	2.700	14.000	245
550	760	230	610	50	45	10	2	5	585	585	2	4	**EVRC 0125**	**ESB.1**	2.920	13.200	**350976 C**	**BFD.1**	**515196**	3.200	16.300	310
600	880	290	680	70	-	-	5	6	670	670	4	5	**EVRC 0126**	**ESB.1**	4.730	21.200	**BFDB 350824 B/HA1**	**BFD.1**	**-**	-	-	550
	910	290	680	70	45	12	5	6	670	670	4	5	**EVRC 0127**	**ESB.1**	4.730	21.200	**350901 C**	**BFD.1**	**-**	-	-	655
670	900	230	725	50	45	12	2	5	705	705	2	4	**EVRC 0128**	**ESB.1**	3.580	19.000	**351761 A**	**BFD.1**	**521823**	3.800	21.200	425

TOLERANCES (P0/P6) - DIN 620

Class P0 tolerances for radial bearings (except tapered roller bearings) (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp} Diametral series			V_{Dmp}	Δ_{Cs}		V_{Cs}	K_{ea}
				8,9	0,1	2,3,4					
over	incl.	high	low	max	max	max	max	min	max	max	max
80	120	0	-20	25	25	15	15	-200	0	25	25
120	180	0	-25	31	31	19	19	-250	0	30	30
180	250	0	-30	38	38	23	23	-300	0	30	40
250	315	0	-35	44	44	26	26	-350	0	35	50
315	400	0	-40	50	50	30	30	-400	0	40	60
400	500	0	-45	56	56	34	34	-450	0	50	65
500	630	0	-50	63	63	38	38	-500	0	60	70
630	800	0	-75	-	-	-	-	-750	0	70	80
800	1.000	0	-100	-	-	-	-	-1000	0	80	90
1.000	1.250	0	-125	-	-	-	-	-1250	0	100	100
1.250	1.600	0	-160	-	-	-	-	-1600	0	120	120
1.600	2.000	0	-200	-	-	-	-	-2000	0	140	140

Class P0 tolerances for radial bearings (except tapered roller bearings) (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp} Diametral series			V_{Dmp}	K_{ea}
				8,9	0,1	2,3,4		
over	incl.	high	low	max	max	max	max	max
80	120	0	-15	19	19	11	11	35
120	150	0	-18	23	23	14	14	40
150	180	0	-25	31	31	19	19	45
180	250	0	-30	38	38	23	23	50
250	315	0	-35	44	44	26	26	60
315	400	0	-40	50	50	30	30	70
400	500	0	-45	56	56	34	34	80
500	630	0	-50	63	63	38	38	100
630	800	0	-75	94	94	55	55	120
800	1.000	0	-100	125	125	75	75	140
1,000	1.250	0	-125	-	-	-	-	160
1.250	1.600	0	-160	-	-	-	-	190
1.600	2.000	0	-200	-	-	-	-	220
2.000	2.500	0	-250	-	-	-	-	250

Class P6 tolerances for radial bearings (except tapered roller bearings) (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp} Diametral series			V_{Dmp}	Δ_{Cs}		V_{Cs}	K_{ea}
				8,9	0,1	2,3,4					
over	incl.	high	low	max	max	max	max	min	max	max	max
80	120	0	-15	19	19	11	11	-200	0	25	13
120	180	0	-18	23	23	14	14	-250	0	30	18
180	250	0	-22	28	28	17	17	-300	0	30	20
250	315	0	-25	31	31	19	19	-350	0	35	25
315	400	0	-30	38	38	23	23	-400	0	40	30
400	500	0	-35	44	44	26	26	-450	0	45	35
500	630	0	-40	50	50	30	30	-500	0	50	40
630	800	0	-50	-	-	-	-	-750	0	55	45
800	1.000	0	-65	-	-	-	-	-1000	0	60	50
1.000	1.250	0	-80	-	-	-	-	-1250	0	70	60
1.250	1.600	0	-100	-	-	-	-	-1600	0	70	70
1.600	2.000	0	-130	-	-	-	-	-2000	0	80	80

Class P6 tolerances for radial bearings (except tapered roller bearings) (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp} Diametral series			V_{Dmp}	K_{ea}
				8,9	0,1	2,3,4		
over	incl.	high	low	max	max	max	max	max
80	120	0	-13	16	16	10	10	18
120	150	0	-15	19	19	11	11	20
150	180	0	-18	23	23	14	14	23
180	250	0	-20	25	25	15	15	25
250	315	0	-25	31	31	19	19	30
315	400	0	-28	35	35	21	21	35
400	500	0	-33	41	41	25	25	40
500	630	0	-38	48	48	29	29	50
630	800	0	-45	56	56	34	34	60
800	1.000	0	-60	75	75	45	45	75
1,000	1.250	0	-80	-	-	-	-	85
1.250	1.600	0	-100	-	-	-	-	100
1.600	2.000	0	-130	-	-	-	-	100
2.000	2.500	0	-160	-	-	-		120

TOLERANCES (P5/P4) - DIN 620

Class P5 tolerances for radial bearings (except tapered roller bearings) (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp} Diametral series		V_{Dmp}	Δ_{Cs}		V_{Cs}	K_{ea}	S_d
				8,9	0,1,2,3,4						
over	incl.	high	low	max	max	max	min	max	max	max	max
80	120	0	-10	10	8	5	-200	0	7	6	9
120	180	0	-13	13	10	7	-250	0	8	8	10
180	250	0	-15	15	12	8	-300	0	10	10	11
250	315	0	-18	18	14	9	-350	0	13	13	13
315	400	0	-23	23	18	12	-400	0	15	15	15
400	500	0	-27	28	21	14	-450	0	18	17	18
500	630	0	-33	35	26	18	-500	0	20	19	20
630	800	0	-40	-	-	-	-750	0	26	22	26
800	1.000	0	-50	-	-	-	-1000	0	32	26	32
1.000	1.250	0	-65	-	-	-	-1250	0	38	30	38
1.250	1.600	0	-80	-	-	-	-1600	0	45	35	45
1.600	2.000	0	-100	-	-	-	-2000	0	55	40	55

Class P5 tolerances for radial bearings (except tapered roller bearings) (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp} Diametral series		V_{Dmp}	V_{Cs}	K_{ea}	S_d
				8,9	0,1,2,3,4				
over	incl.	high	low	max	max	max	max	max	max
80	120	0	-10	10	8	5	8	10	9
120	150	0	-11	11	8	6	8	11	10
150	180	0	-13	13	10	7	8	13	10
180	250	0	-15	15	11	8	10	15	11
250	315	0	-18	18	14	9	11	18	13
315	400	0	-20	20	15	10	13	20	13
400	500	0	-23	23	17	12	15	23	15
500	630	0	-28	28	21	14	18	25	18
630	800	0	-35	35	26	18	20	30	20
800	1.000	0	-40	50	29	25	25	35	30
1.000	1.250	0	-50	-	-	-	30	50	40
1.250	1.600	0	-65	-	-	-	40	65	50

Class P4 tolerances for radial bearings (except tapered roller bearings) (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp} Diametral series		V_{Dmp}	Δ_{Cs}		V_{Cs}	K_{ea}	S_d
				8,9	0,1,2,3,4						
over	incl.	high	low	max	max	max	min	max	max	max	max
80	120	0	-8	8	6	4	-200	0	4	5	5
120	180	0	-10	10	8	5	-250	0	5	6	6
180	250	0	-12	12	9	6	-300	0	6	8	7
250	315	0	-15	-	-	-	-350	0	7	8	7
315	400	0	-19	-	-	-	-400	0	8	10	8
400	500	0	-23	-	-	-	-450	0	9	10	9
500	630	0	-26	-	-	-	-500	0	10	12	10
630	800	0	-34	-	-	-	-750	0	15	15	15

Class P4 tolerances for radial bearings (except tapered roller bearings) (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp} Diametral series		V_{Dmp}	V_{Cs}	K_{ea}	S_d
				8,9	0,1,2,3,4				
over	incl.	high	low	max	max	max	max	max	max
80	120	0	-8	8	6	4	4	6	5
120	150	0	-9	9	7	5	5	7	5
150	180	0	-10	10	8	5	5	8	5
180	250	0	-11	11	8	6	7	10	7
250	315	0	-13	13	10	7	7	11	8
315	400	0	-15	15	11	8	8	13	10
400	500	0	-20	-	-	-	9	14	10
500	630	0	-25	-	-	-	10	17	12
630	800	0	-28	-	-	-	12	20	14
800	1.000	0	-35	-	-	-	15	25	20
1.000	1.250	0	-40	-	-	-	20	30	25
1.250	1.600	0	-55	-	-	-	25	40	30

TOLERANCES (P0/P6X) - DIN 620

Class P0 tolerances for tapered roller bearings (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	Δ_{Cs}		K_{ea}	Δ_{Ts}	
over	incl.	high	low	max	max	min	max	max	min	max
80	120	0	-20	20	15	-200	0	30	-200	+200
120	180	0	-25	25	19	-250	0	35	-250	+350
180	250	0	-30	30	23	-300	0	50	-250	+350
250	315	0	-35	35	26	-350	0	60	-250	+350
315	400	0	-40	40	30	-400	0	70	-400	+400
400	500	0	-45	45	-	-450	0	70	-400	+400
500	630	0	-50	50	-	-500	0	85	-500	+500
630	800	0	-75	75	-	-750	0	100	-600	+600
800	1.000	0	-100	100	-	-1000	0	120	-750	+750

Class P0 tolerances for tapered roller bearings (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	K_{ea}
over	incl.	high	low	max	max	max
80	120	0	-18	18	14	35
120	150	0	-20	20	15	40
150	180	0	-25	25	19	45
180	250	0	-30	30	23	50
250	315	0	-35	35	26	60
315	400	0	-40	40	30	70
400	500	0	-45	45	34	80
500	630	0	-50	50	38	100
630	800	0	-75	75	-	120
800	1.000	0	-100	100	-	120
1,000	1.250	0	-125	125	-	120
1.250	1.600	0	-160	160	-	120

Class P6X tolerances for tapered roller bearings (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	Δ_{Cs}		K_{ea}	Δ Ts	
over	incl.	high	low	max	max	min	max	max	min	max
80	120	0	-20	20	15	-50	0	30	0	+100
120	180	0	-25	25	19	-50	0	35	0	+150
180	250	0	-30	30	23	-50	0	50	0	+150
250	315	0	-35	35	26	-50	0	60	0	+200
315	400	0	-40	40	30	-50	0	70	0	+200

Class P6X tolerances for tapered roller bearings (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	ΔCs		K_{ea}
over	incl.	high	low	max	max	min	max	max
80	120	0	-18	18	14	-100	0	35
120	150	0	-20	20	15	-100	0	40
150	180	0	-25	25	19	-100	0	45
180	250	0	-30	30	23	-100	0	50
250	315	0	-35	35	26	-100	0	60
315	400	0	-40	40	30	-100	0	70
400	500	0	-45	45	34	-100	0	80
500	630	0	-50	50	38	-100	0	100

TOLERANCES (P5/P4) - DIN 620

Class P5 tolerances for tapered roller bearings (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	Δ_{Cs}		K_{ea}	S_d	Δ_{Ts}	
over	incl.	high	low	max	max	min	max	max	max	min	max
80	120	0	-15	11	8	-400	0	8	9	-200	+200
120	180	0	-18	14	9	-500	0	11	10	-250	+350
180	250	0	-22	17	11	-600	0	13	11	-300	+350
250	315	0	-25	-	-	-	0	-	13	-350	+350
315	400	0	-30	-	-	-	0	-	15	-400	+400
400	500	0	-35	-	-	-	0	-	17	-450	+400
500	630	0	-40	-	-	-	0	-	20	-500	+500
630	800	0	-75	-	-	-	0	-	30	-750	+600

Class P5 tolerances for tapered roller bearings (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	K_{ea}	S_D
over	incl.	high	low	max	max	max	max
80	120	0	-13	10	7	10	9
120	150	0	-15	11	8	11	10
150	180	0	-18	14	9	13	10
180	250	0	-20	15	10	15	11
250	315	0	-25	19	13	18	13
315	400	0	-28	22	14	20	13
400	500	0	-33	-	-	23	15
500	630	0	-38	-	-	25	18
630	800	0	-45	-	-	30	20
800	1.000	0	-60	-	-	35	30

Class P4 tolerances for tapered roller bearings (µm)

Inner ring d (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	Δ_{Cs}		K_{ea}	S_d	Δ_{Ts}	
over	incl.	high	low	max	max	min	max	max	max	min	max
80	120	0	-10	8	5	-400	0	5	5	-200	+200
120	180	0	-13	10	7	-500	0	6	6	-250	+350
180	250	0	-15	11	8	-600	0	8	7	-250	+350

Class P4 tolerances for tapered roller bearings (µm)

Outer ring D (mm)		Δ_{dmp}		V_{Dp}	V_{Dmp}	K_{ea}	S_D	Sea
over	incl.	high	low	max	max	max	max	max
80	120	0	-10	8	5	6	5	6
120	150	0	-11	8	6	7	5	7
150	180	0	-13	10	7	8	5	8
180	250	0	-15	11	8	10	7	10
250	315	0	-18	14	9	11	8	10
315	400	0	-20	15	10	13	10	13

HEIGHT TOLERANCES - DIN 620

HEIGHT OF THE BEARING - Tolerances for axial roller bearing (Precision class P0, P6, P5)											
Height of the bearing d (mm)		ΔT_S		$\Delta T1_S$		$\Delta T2_S$		$\Delta T3_S$		$\Delta T4_S$ - ISO	
over	incl.	high	low	high	low	high	low	high	low	high	low
-	30	+20	-250	+100	-250	+150	-400	+300	-400	+20	-300
30	50	+20	-250	+100	-250	+150	-400	+300	-400	+20	-300
50	80	+20	-300	+100	-300	+150	-500	+300	-500	+20	-300
80	120	+25	-300	+150	-300	+200	-500	+400	-500	+25	-300
120	180	+25	-400	+150	-400	+200	-600	+400	-600	+25	-400
180	250	+30	-400	+150	-400	+250	-600	+500	-600	+30	-400
250	315	+40	-400	-	-	-	-	-	-	+40	-400
315	400	+40	-500	-	-	-	-	-	-	+40	-500
400	500	+50	-500	-	-	-	-	-	-	+50	-500
500	630	+60	-600	-	-	-	-	-	-	+60	-600
630	800	+70	-750	-	-	-	-	-	-	+70	-750
800	1000	+80	-1000	-	-	-	-	-	-	+80	-1000
1000	1250	+100	-1400	-	-	-	-	-	-	+100	-1400
1250	1600	+120	-1600	-	-	-	-	-	-	+120	-1600

RADIAL CLEARANCES - DIN 620

Radial internal clearance of the cylindrical roller bearing with cylindrical bore															
Bore diameter (mm)		Radial internal clearance (µm)													
		C1		SPC2		C2		Normale		C3		C4		C5	
over	incl.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
80	100	10	30	25	45	15	50	50	85	75	110	105	140	155	190
100	120	10	30	25	50	15	55	50	90	85	125	125	165	180	220
120	140	10	35	30	60	15	60	60	105	100	145	140	190	200	245
140	160	10	35	35	65	20	70	70	120	115	165	165	215	228	275
160	180	10	40	35	75	25	75	75	125	120	170	170	220	280	300
180	200	15	45	40	80	35	90	90	145	140	195	195	250	275	330
200	225	15	50	45	90	45	105	105	165	160	220	220	280	305	365
225	250	15	50	50	100	45	110	110	175	170	235	235	300	330	396
250	280	20	55	55	110	55	125	125	195	190	260	260	330	370	440
280	315	20	60	60	120	55	130	130	205	200	275	275	350	410	485
315	355	20	65	65	135	65	145	145	225	225	305	305	385	455	535
355	400	25	75	75	150	100	190	190	280	280	370	370	460	510	600
400	450	25	85	85	170	110	210	210	310	310	410	410	510	565	665
450	500	25	95	95	190	110	220	220	330	330	440	440	550	625	735
500	560	25	105	105	210	120	240	240	360	360	480	480	600	690	810
560	630	25	115	115	230	140	260	260	380	380	500	500	620	780	900
630	710	30	130	130	260	145	285	285	425	425	560	560	705	865	1.005
710	800	35	145	145	290	150	310	310	470	470	630	630	790	975	1.135
800	900	40	160	160	320	180	350	350	520	520	690	690	860	1.095	1.265
900	1.000	-	-	-	-	200	390	390	580	580	770	770	960	1.215	1.405
1.000	1.120	-	-	-	-	220	430	430	640	640	850	850	1.060	1.355	1.565
1.120	1.250	-	-	-	-	230	470	470	710	710	950	950	1.190	1.510	1.750
1.250	1.400	-	-	-	-	270	530	530	790	790	1.050	1.050	1.310	1.680	1.940
1.400	1.600	-	-	-	-	330	610	610	890	890	1.170	1.170	1.450	1.920	2.200
1.600	1.800	-	-	-	-	380	700	700	1.020	1.020	1.340	1.340	1.660	2.160	2.480
1.800	2.000	-	-	-	-	400	760	760	1.120	1.120	1.480	1.480	1.840	2.390	2.760

NOTES

NOTES

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